BIT 3

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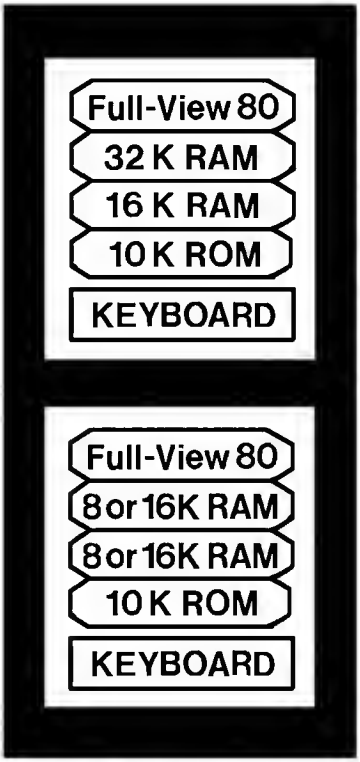

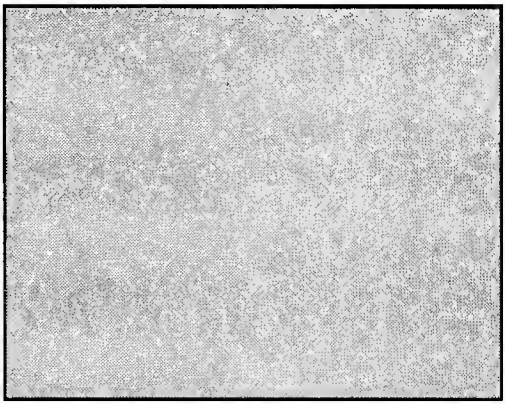

FULL-VIEW 80™

for the ATARI 800

Publication No. 800000010 (F-V 80)

DISCLAIMER

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NOTE :

rev. 2, 8/82

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INTRODUCTION

The FULL-VIEW 80 card is an attachment to your ATARI 800 computer that provides a display containing twice as many characters as the normal ATARI display. The FULL-VIEW 80 80 X 24 display format is the size that the computing industry has established as standard and makes your ATARI 800 a more enjoyable and useful tool in professional and business applications.

The ATARI 40 X 24 text and graphic displays are still available to the user. The 40 x 24, 80 X 24, and graphic images can all be selected for display dynamically under keyboard or program control on the same monitor. This provides the user a full view of all display modes.

Control and display memory for the card is contained on the card. A disk drive is not required. There is no miminum ATARI memory size requirement. A monitor is required. The card will not work with a TV set.

Some good monocromatic monitors to use with the FULL-VIEW 80 are the 12" model KG-12N KAGA, the BMC 12" monitor, the SANYO 12" monitor, and the ZENITH 12" monitor. In general any monocromatic composite video monitor with a green or white phosphor will work well.

Most low cost color monitors do not provide the bandwidth needed to display 80 columns. The trend is that the cost of color monitors is declining and the quality is increasing. It is likely that 80 column color monitors will be available soon. The 80 column text screen is monocromatic so the color monitor would only be useful to display the ATARI graphics.

Since the card installs in one of the RAM slots it makes that slot unavailable for a 16K RAM card. You can still have 48K of RAM memory if you use a 32K RAM card in one of the two remaining RAM slots. The BIT 3 32K MEMORY PLUS card provides 32K on one card and, when used with the FULL-VIEW 80 and one 16K ATARI RAM card, will give you a 48K 80 X 24 system. RAM cards from other companies will also work but, of course, we prefer that you use our 32K RAM card.

The standard firmware installed on the card works with 60 hz AC monitors. Firmware for use with 50 HZ AC power is available from Bit 3.

INSTALLATION

Your FULL-VIEW 80 package should contain the following items:

* The FULL-VIEW 80 card
* This manual
* A piece of metal tape 3/4" X 2"
* A warranty card

Take time now to fill out and mail the warranty card. Your name will then be placed on our mailing list to receive update information on the FULL-VIEW 80 and other BIT 3 products.

INSTALLING THE CARD IN THE ATARI 800

Carefully follow the directions to install the FULL-VIEW 80 in your ATARI 800.

1) TURN OFF POWER TO YOUR ATARI. UNPLUG THE AC POWER CORD. Serious damage can result from installing the card with the power on.

2) The FULL-VIEW 80 MUST be installed in RAM slot 3. This is the last slot towards the rear of the ATARI card cage.

3) Open the hinged cover as though you were to install a game cartridge and locate the two "flippers" just to the left and right of the cartridge slots. Rotate them so that they no longer press down on the metal ridge of the card cage cover. Next pull the card cage cover slightly forward and up. It should lift away from the ATARI exposing the four slot card cage. BEFORE trying to install the FULL-VIEW 80 you should practice replacing the cover. There are two metal tabs on the back of the card cage cover that slip into slots on the back of the card cage. Press down on the back of the cover and slide it into the slots, then press it down flush in front of the "flippers" so that you can rotate the flippers back over the lid.

4) Plug the FULL-VIEW 80 card into the last card slot towards the rear of the ATARI 800. The blue label must face the back of the ATARI and the black plastic panel on the card must face towards the ATARI keyboard. Route the cable over the left hand ridge of the card cage and out towards the rear of the ATARI in the channel formed by the outside of the metal card cage and the

white plastic ATARI cover.

5) Locate the metal tape and cut it into two pieces with a scissors. You will be left with two pieces both 3/4" by 1". Remove the backing from one of the pieces and attach the tape over the left hand edge of the metal card cage near the rear of the cage where the FULL-VIEW 80 cable will come out. Fold the tape over and press it flat so that it adheres to both the outside and inside of the card cage. Lay the FULL-VIEW 80 flat cable on top of and in the middle of the tape that you have just placed on the card cage. Form the cable in a upside down "U" shaped loop so that it fits over the left hand edge of the card cage. Remove the backing from the second piece of metal tape and place it over the flat cable. Press it down on both the outside and inside of the card cage so that the flat cable is sandwiched between the top and bottom pieces of the metal tape.

6) Plug the long (larger of the two connectors) cable connector into the socket on the right hand side of the ATARI near the serial I/O cable connector. This connector provides the source for the normal 40 X 24 and graphic images that you will see on your monitor.

7) Plug the cable from your monitor into the small cable connector on the FULL-VIEW 80 cable assembly.

8) Double check your installation to this point. Make sure that the card is seated securely in the card slot and that the flat cable is routed properly.

9) Replace the card cage cover. It will fit over the FULL-VIEW 80 cable. The cable will end up with the doughnut-shaped toroid core just outside the rear of the ATARI with the cover installed.

10) Plug in the AC power cord and turn on power to the ATARI. Your ATARI will power on and display the standard ATARI 40 X 24 screen on the monitor.

11) Look at the back of your monitor. If it has a switch labeled 75 ohm, set the switch to the 75 ohm position. (You can experiment with this later but most monitors work best in the 75 ohm position.)

12) Find the contrast adjustment on your monitor and turn it to a mid-range position (halfway). Turn up the brightness control to a midrange position also.

13) Install the BASIC cartridge and type A=USR(54818) (return). This installs the FULL-VIEW 80 as the system console. You should see "READY" on your monitor screen. Type some characters on the screen and press return. Continue to type until several lines of data are displayed.

14) If the image is not steady you may have to adjust the vertical hold or the horizontal hold controls on your monitor. If the image spills off the screen turn to the trouble-shooting guide at the back of the manual.

15) Adjust the monitor brightness and contrast controls to fine tune the character image for the best picture.

OPERATORS GUIDE

The FULL-VIEW 80 has two operating modes:

1) You can install the card as the system console and replace the 40 X 24 screen as the system console. This is probably the way that you will most often use the FULL-VIEW 80.

2) You can retain the ATARI 40 X 24 screen as the system console and write to the 80 X 24 screen as though it was a peripheral device such as a terminal or a printer.

USING THE FULL-VIEW 80 CARD AS THE SYSTEM CONSOLE

To install the 80 X 24 display as the system console insert your BASIC cartridge into the cartridge slot and, after you get the BASIC prompt "READY", type A=USR(54818)(return). The phrase (return) means "depress the RETURN key". The card will automatically switch to the 80 X 24 format and you will again get the BASIC prompt "READY" but this time it will be on the BIT 3 80 X 24 screen. The A=USR(54818) command can also be used in deferred mode as a statement in a program to turn on the 80 X 24 card.

You can load and run programs from the disk just as before. You can also type DOS to get the DOS menu on the 80 X 24 screen. BASIC programs can be written, edited, listed and run from the 80 X 24 system console.

There are two ways to return to the 40 X 24 system console:

1) Hold down the option key and depress the system reset key.

or

2) Type A=USR(54879)

NOTE: The operation of the ATARI BASIC USR statement is slightly different from the MICROSOFT BASIC USR statement. From MICROSOFT BASIC use the command A=USR(54819) to turn on the card and A=USR(54880) to turn off the card. If you want to use a BASIC "CALL" satement (not available in ATARI BASIC) use 54819 and 54880 as the addresses.

USING THE CARD WITHOUT A BASIC CARTRIDGE

The card can be turned on directly from DOS by loading and executing a small machine language program. The program to turn on the card is:

```
LDA #$18
STA $D508  ;SELECT BANK0
JSR $D623  ;INSTALL 80 X 24
JMP $E474  ;SYSTEM RESET
```

The program to turn off the card is:

```
LDA #$18
STA $D508  ;SELECT BANK0
JSR $D660  ;TURN OFF THE CARD
JMP $E474  ;SYSTEM RESET
```

You can create these programs from BASIC or with a machine language assembler and then save them on the diskette using the BINARY SAVE (K) DOS option. You can then use the BINARY LOAD (L) DOS option to load and run the program.

Use the DOS A command to check for a MEM.SAV file in the disk directory. If your diskette has a MEM.SAV file you should delete it by using the D command. You can use the N command later to create a new MEM.SAV file.

The following two BASIC programs create the machine language code that will work with the DOS menu to turn the card on or off. Once the machine language programs have been created and saved on the diskette you will no longer need the BASIC programs unless you want to recreate the binary load files.

The following BASIC program creates the turn on program.

```
10 POKE 1536,169:POKE 1537,24
20 POKE 1538,141:POKE 1539,8:POKE 1540,213
30 POKE 1541,32:POKE 1542,35:POKE 1543,214
40 POKE 1544,76:POKE 1545,116:POKE 1546,228
50 END
```

Run this program then type DOS to get the DOS menu. Select option K and type:

```
ON,600,610,600,600
```

This saves the turn on program on the diskette under the name "ON" and makes it a load and run file.

The turn off program is:

```
10 POKE 1536,169:POKE 1537,24
20 POKE 1538,141:POKE 1539,8:POKE 1540,213
30 POKE 1541,32:POKE 1542,96:POKE 1543,214
40 POKE 1544,76:POKE 1545,116:POKE 1546,228
50 END
```

Run this program then type DOS to get the DOS menu. Select option K and type:

OFF,600,610,600,600

This saves the turn off program on the diskette under the name "OFF" and makes it a load and run file.

Now you can turn the card on or off from DOS by selecting the L option and loading "ON" to turn the card on and "OFF" to turn the card off.

PROGRAMMING EXAMPLE

The 80 X 24 display is as easy to use as the 40 X 24 display. Try this simple program to get a feel for programming in the 80 X 24 mode.

First activate the 80 X 24 display with the A=USR(54818)(return) command, then type NEW(return) to clear any existing program.

```
10 PRINT "THIS IS AN EXAMPLE OF PROGRAMMING IN THE FULL-VIEW 80
    80 X 24 DISPLAY"

20 GOTO 10
```

Run the program. Experiment with running the program on both the 80 X 24 and 40 X 24 displays. Also, LIST the program on both displays.

KEYBOARD EDITING WITH THE FULL-VIEW 80

After installing the card as the system console the FULL-VIEW 80 has control of the ATARI keyboard. The card duplicates all of the standard ATARI keyboard commands and adds extra features to make your job easier. Some of the cursor movement commands operate in a slightly different manner than they do on the ATARI 40 X 24 screen. The changes were implemented to make the functions more compatible with industry standard 80 column operations.

STANDARD KEYBOARD COMMANDS (duplicated by the FULL-VIEW 80)

BREAK	----- STOP PROGRAM EXECUTION
CAPS LOWR	----- SELECT LOWER CASE
ATARI KEY	----- SELECT INVERSE VIDEO
CTRL 1	----- STOP LIST
CRTL (ARROWS)	----- POSITION CURSOR
CTRL INSERT	----- INSERT CHARACTER
CTRL DELETE	----- DELETE CHARACTER
SHIFT INSERT	----- INSERT LINE
SHIFT DELETE	----- DELETE LINE
SHIFT CLEAR	----- CLEAR SCREEN
TAB	----- TAB
SHIFT TAB	----- TAB SET
CTRL TAB	----- TAB CLEAR
BACK S	----- DELETE BACKSPACE

ADDED COMMANDS

The following commands are added by the FULL-VIEW 80 :

CRTL A	----- DISPLAY THE ATARI SCREEN
CTRL B	----- DISPLAY THE BIT 3 80 X 24 SCREEN
CTRL C	----- TOGGLES THE CURSOR TYPE (UNDERLINE/BLOCK)
CTRL E	----- CLEAR TO THE END OF THE LINE
CTRL S	----- CLEAR TO THE END OF THE SCREEN

You can mix upper and lower case in BASIC PRINT statements but be sure to switch back to upper case for commands such as RUN, LIST, etc. since the ATARI does not understand those commands in lower case.

PROGRAMMING EXAMPLE

Try this program:

```
10 PRINT "UPPER / lower case"
20 GOTO 10
```

THE VIDEO SWITCH

The video switch is an important feature of the FULL-VIEW 80. It permits you to view either the display from the standard ATARI 800 or the 80 character display from the FULL-VIEW 80. You can flip back and forth between screens without re-cabling or manually changing switches. Either screen can be selected for display on the same monitor under keyboard or program control.

> Of course if you want to use two monitors to display both screens at the same time you can do so by connecting one monitor to the short FULL-VIEW 80 cable and connecting the other monitor to the ATARI video connector. (Leave the long FULL-VIEW 80 cable disconnected.)
>
> You can also have your TV set or color monitor attached to the standard ATARI video cable while the FULL-VIEW 80 is connected to the ATARI video connector and to your monitor. You will always see the output from the ATARI 40 character screen on your TV set.

The FULL-VIEW 80 automatically selects ATARI 40 column video when you turn on power to the ATARI. You can run your 40 column software the same as if the 80 character card was not installed. When you select the FULL-VIEW 80 it automatically switches over to the 80 character display.

There are two commands that control the video switch:

(1) CTRL-A
(2) CTRL-B

Both commands work from the keyboard or from within a program.

The CTRL-A command switches the video switch over to the ATARI 800 display. The display will continue to hold the ATARI image even though data may be written on the 80 X 24 display. This will allow you to view the data previously written to the 40 column screen by your program even though you are currently using the 80 column screen. The 40 column screen is cleared upon entering the 80 column mode; therefore, if you are just testing the "CTRL-A" command you will normally have a blank 40 column screen. The CRTL-B command switches to the BIT 3 80 X 24 display. The 80 X 24 display is automatically selected when the 80 character editor is opened with a A=USR(54818) command or when the the card is opened with an IOCB OPEN command. It switches back to the 40 X 24 screen when the card is closed with a IOCB CLOSE command providing the card is not selected as the system console.

The VIDEO SWITCH can also be controlled by writing directly to a hardware register on the card. A $18 (decimal 24) sent to address $D508 (decimal 54536) will display the 80 X 24 screen. A $08 (decimal 8) will display the 40 X 24 screen. The next character sent to the card after directly changing the hardware register will cause the video switch to revert to

the state that was selected prior to the user changing the hardware register.

If the card is installed as the system console it will automatically switch over to the 40 X 24 display if any graphic mode other than GRAPHICS 0 is selected. The card will switch back to the 80 X 24 mode when graphics mode 0 is re-selected.

SCROLLING

The screen will scroll up one line if the cursor is on the last line and any of the following events occur:

(1) a character is written into the 80th character position
(2) a line feed command is received
(3) a carriage return command is received

The screen will scroll down one line if the cursor is on the top line and a "CURSOR UP" command is received.

WRITING DATA TO THE FULL-VIEW 80 CARD

A total of 126 different symbols can be displayed by the FULL-VIEW 80 card. They include all of the normal 96 character ASCII symbols and 30 special symbols. Also many different control code sequences can be included in the data to perform tasks such as cursor movement or clearing the screen. The following table shows the standard ASCII codes.

Characters can be sent to the card by using a BASIC "PRINT" statement or by using the BASIC "CHR$" command. For example, both PRINT "A"; and PRINT CHR$(65); will print an "A" on the screen. The "CHR$" command is normally used to send codes to the card that do not have a convenient keyboard code such as escape, or shift clear for clear screen.

ASCII CODE		CHARACTER
DEC	HEX	
032	$20	space
033	$21	!
034	$22	"
035	$23	#
036	$24	$
037	$25	%
038	$26	&
039	$27	'
040	$28	(
041	$29	)
042	$2A	*
043	$2B	+
044	$2C	,
045	$2D	-
046	$2E	.
047	$2F	/
048	$30	0
049	$31	1
050	$32	2
051	$33	3
052	$34	4
053	$35	5
054	$36	6
055	$37	7
056	$38	8
057	$39	9
058	$3A	:
059	$3B	;
060	$3C	<
061	$3D	=
062	$3E	>
063	$3F	?
064	$40	@
065	$41	A
066	$42	B
067	$43	C

068	$44	D
069	$45	E
070	$46	F
071	$47	G
072	$48	H
073	$49	I
074	$4A	J
075	$4B	K
076	$4C	L
077	$4D	M
078	$4E	N
079	$4F	O
080	$50	P
081	$51	Q
082	$52	R
083	$53	S
084	$54	T
085	$55	U
086	$56	V
087	$57	W
088	$58	X
089	$59	Y
090	$5A	Z
091	$5B	[
092	$5C	\
093	$5D	]
094	$5E	^
095	$5F	_
096	$60	`
097	$61	a
098	$62	b
099	$63	c
100	$64	d
101	$65	e
102	$66	f
103	$67	g
104	$68	h
105	$69	i
106	$6A	j
107	$6B	k
108	$6C	l
109	$6D	m
110	$6E	n
111	$6F	o
112	$70	p
113	$71	q
114	$72	r
115	$73	s
116	$74	t
117	$75	u
118	$75	v
119	$76	w
120	$78	x
121	$79	y

122	$7A		z
123	$7B		{
124	$7C		|
125	$7D	}	clear screen
126	$7E	~	backspace
127	$7F	■	tab

CONTROL CODES

The following codes are normally called "Control Codes". Some of these codes will cause certain actions to take place when they are received by the FULL-VIEW 80 card. Those actions are listed in the following table. It is also possible to have the control codes display a symbol rather than perform the indicated function. This will be explained in the next section on the display control codes function.

You can easily send these codes to the FULL-VIEW 80 card with the CHR$ command. For example, PRINT CHR$(28); sends a code to the card which tells it to move the cursor up one line.

ASCII CODE DEC	HEX	FUNCTION	FULL-VIEW 80 ACTION
000	$00	ctrl-@	space
001	$01	ctrl-A	select ATARI video
002	$02	ctrl-B	select BIT 3 video
003	$03	ctrl-C	toggle cursor type
004	$04	ctrl-D	
005	$05	ctrl-E	clear to end of line
006	$06	ctrl-F	
007	$07	ctrl-G	
008	$08	ctrl-H	
009	$0B	ctrl-I	
010	$0A	ctrl-J	
011	$0B	ctrl-K	
012	$0C	ctrl-L	
013	$0D	ctrl-M	
014	$0E	ctrl-N	
015	$0F	ctrl-O	
016	$10	ctrl-P	
017	$11	ctrl-Q	
018	$12	ctrl-R	
019	$13	ctrl-S	clear to end of screen
020	$14	ctrl-T	
021	$15	ctrl-U	
022	$16	ctrl-V	
023	$17	ctrl-W	
024	$18	ctrl-X	
025	$19	ctrl-Y	
026	$1A	ctrl-Z	
027	$1B	escape	escape
028	$1C	------	cursor up
029	$1D	------	cursor down
030	$1E	------	backspace
031	$1F	------	cursor forward
125	$7D	clear	clear screen
126	$7E	back s	delete backspace

127	$7F	TAB	tab
129	$81	INV CTRL-A	select ATARI VIDEO
130	$82	INV CTRL-B	select BIT 3 VIDEO
131	$83	INV CTRL-C	select cursor type
133	$85	INV CTRL-E	clear to end of line
147	$93	INV CTRL-S	clear to end of screen
155	$9B	RETURN	return
156	$9C	DELETE	delete line
157	$9D	INSERT	insert line
158	$9E	CLR TAB	clear tab
159	$9F	SET TAB	set tab
253	$FD	------	bell
254	$FE	DELETE	delete character
255	$FF	INSERT	insert character

You can display the symbol for the control code instead of executing it if you preceed the control code with the ESC key. In this way you can include control code commands in BASIC print statements without using the CHR$ command. For example, ESC CTRL ↑ displays an up arrow symbol instead of moving the cursor up.

If the DISPLAY CONTROL CODES memory location DSPFLG ($2FE or DEC 766) is set to a non zero value and if the card is installed as the system console the control code symbols will be displayed instead of executed. If you are not using the card as the system console you can define a function at OPEN time instructing the card to display control codes.

The control code symbols include a line drawing graphics character set and other unique symbols not included in the ASCII character set.

This BASIC program will display the entire FULL-VIEW 80 character set:

```
10 POKE 766,10
20 FOR N=0 TO 255
30 PRINT CHR$(N);" ";
40 NEXT N
50 POKE 766,0
60 END
```

INVERSE VIDEO CHARACTERS

Any character received by the FULL-VIEW 80 with the high (MSB) bit set will be displayed in inverse video. You can use the "INV" key to create inverse video characters or you can use the CHR$ command to send inverse video characters to the card.

TABBING (ATARI BASIC)

The BASIC "COMMA" command works as it does with the 40 character screen.

The TAB, TAB SET, and TAB CLEAR commands also work but the maximum tab line length is 80 characters instead of 120.

CURSOR POSITIONING

The POSITION X,Y command can be used from BASIC to position the cursor provided that the FULL-VIEW 80 is installed as the system console. The range of the X value is 0 to 79 and the range of the Y value is 0 to 23. Values out of range will position the cursor to the 0,0 (upper left hand corner) position.

Try this program:

```
10 X=0
20 Y=0
30 POSITION X,Y
40 PRINT "*";
50 X=X+1:IF X=80 THEN X=0
60 Y=Y+1:IF Y=24 THEN Y=0
70 GOTO 30
```

The system console uses ROWCRS ($54 ,decimal 84) for the cursor Y position and COLCRS ($55 ,decimal 85) for the cursor X position. You can also position the cursor by changing the value of these locations.

If the card is not installed as the system console you can position the cursor by POKING the CURSOR X value in location 256 decimal and the CURSOR Y value in location 257.

HANDLER TABLES

ROM on the card is mapped from location $D600 to $D6FF.

The handler table for the 80 column screen editor is located at address $D600.

The first two bytes in the table point to the address-1 of the editor open routine.

The second two bytes point to the address-1 of the editor close routine.

The third two bytes point to the address-1 of the editor read character routine

The fourth two bytes point to the address-1 of the editor output character routine

The fifth two bytes point the address-1 of the editor status routine.

The sixth two bytes point to the address-1 of the editor special function routine. (no special functions are implemented)

The next three bytes contain a jump instruction to the editor power up initialization routine.

A second handler table, used when the card is implemented as an output device only, is located at address $D650.

The first two bytes point to the address-1 of the display handler open routine.

The second two bytes point to the address-1 of the display handler close routine.

The third two bytes point to the address-1 of the display handler read character routine.

The forth two bytes point to the address-1 of the display handler output character routine.

The fifth two bytes point to the address-1 of the display handler status routine.

The sixth two bytes point to the address-1 of the display handler special function routine. (no special functions are implemented)

The next three bytes contain a jump to the display handler power up initialization routine.

Locations $D61F,$D620, and $D621 contain the editor device/filename spec.

Location $D622 (decimal 54818) is the address of the user routine that installs the card as the system console. The ATARI BASIC USR command requires a PLA instruction to align the stack. Calls to this routine from assembly language should use address $D623 which bypasses the PLA. Location $D65F is the address of the user routine to disconnect the card as the system console. Calls to this routine from assembly language should use address $D660 to bypass the PLA instruction at $D65F.

USING THE FULL-VIEW 80 AS AN OUTPUT DEVICE ONLY

The card can be used as a peripheral device such as a computer terminal if you add the device to the DEVICE TABLE. This is required after power up or after a system reset since the system reset erases the device table.

Three bytes are required for the device table. The first byte is an ASCII character to identify the device type and the next two bytes are the address in low byte/high byte format of the device handler table.

For example, POKE 812,70 followed by POKE 813,80 and POKE 814,214 installs the 80 column display handler as device "F" in the device table. Thereafter you can use the OPEN, CLOSE, PRINT, and GET commands to control the display.

The OPEN command takes the form OPEN #aexp,aexp1,aexp2,filespec.

aexp is the IOCB number

aexp1 is a code to determine the input or output operation. Use 4 for input only, 8 for output only, or 12 for both input or output.

aexp2 holds special control commands for the display handler.

If BIT 5 (decimal value 32) is "on" the display handler will display control codes instead of acting on them.

The CLOSE command will turn the video switch back to the 40 X 24 display unless the 80 X 24 display is installed as the system console.

PROGRAMMING EXAMPLE

```
5   POKE 54536,24:REM INSURE BANK 0
10  POKE 812,70:POKE 813,80:POKE 814,214
20  OPEN #2,12,0,"F"
30  X=0
40  Y=0
50  POKE 256,X:POKE 257,Y
60  PRINT #2;"HI THERE";
70  X=X+1:IF X=80 THEN X=0
80  Y=Y+1:IF Y=24 THEN Y=0
90  GOTO 50
```

The FULL-VIEW 80 card uses a technique called BANK SWITCHING to make more program memory available to the card. When the card is used in the non-screen console mode it is necessary to insure that bank 0 is selected before writing data. This is accomplished by writing to location $D508 (decimal 54536). Bits 0,1,2,and 5 select the bank address. All of these bits must be 0 to select bank 0. Bit 3 unblanks the 80 X 24 display and Bit 4 turns the video switch to 80 X 24.

A system reset will leave the currently executing bank selected so your program should make sure to restore bank 0 as part of the system reset recovery procedure.

USING THE CARD WITH STANDARD SOFTWARE

In recent months there has been an explosion of software for the ATARI 800 computer. We have tested the FULL-VIEW 80 with many of the software packages and have tried to make it as compatible as possible with them.

Following are comments on some of the major ATARI 800 software packages:

ATARI BASIC CARTRIDGE -- works ok

BASIC A+ (Optimized Systems Software Inc.) -- works ok

OS/A+ (Optimized Systems Software Inc.) -- works ok

EASMD (Optimized Systems Software Inc.) -- works ok

MICROSOFT BASIC --ok but see MICROSOFT BASIC notes

ATARI PASCAL --works ok

ATARI ASSEMBLER EDITOR CARTRIDGE --works ok

ATARI MACRO ASSEMBLER --works ok (but use MEDIT in 40 char. mode)

ATARI WORD PROCESSOR --no (uses graphics screen)

ATARI TEXT EDITOR (MEDIT) -no (uses graphics screen) You can use the EDIT 6502 or EASMD editors to create DOS compatible text files with the FULL-VIEW 80.

LJK LETTER PERFECT --works with new 80 column LETTER PERFECT

LJK DATA PERFECT --works with new 80 column DATA PERFECT

LJK EDIT 6502 --works with new 80 column EDIT 6502

We will continue to update this list as new software products become available. In general, if a software package uses the standard CIO screen editor to display text it is likely to work on the 80 X 24 display but if it displays text by using one of the graphics modes other than graphics 0 it will not work on the 80 X 24 screen.

MICROSOFT BASIC

The operation of the MICROSOFT BASIC USR statement is slightly different from the ATARI BASIC USR command. From MICROSOFT BASIC use the command A=USR(54819) to turn the card on and A=USR(54880) to turn the card off.

MICROSOFT BASIC "knows" that the ATARI 800 has a 40 column screen so it checks to insure that it doesn't write past the 40 column end of screen. The following program will print only 40 columns of text on the screen:

```
10 PRINT "TEST ";
20 GOTO 10
```

The FULL-VIEW 80 will correct this problem if you POKE 64 into location 258. For example,

```
5  POKE 258,64
10 PRINT "TEST ";
20 GOTO 10
```

The program will now print TEST after TEST all the way out to 80 columns.

After POKE 258,64 the MICROSOFT BASIC comma tabbing will work on the full screen width. The SPC (ie PRINT SPC(50)) command will also work. The TAB command does not work nor does the PRINT AT X,Y work with X values larger than 40. You can TAB and position the cursor with a POKE 256,X for the cursor X position and a POKE 84,Y for the cursor Y position. This method of positioning the cursor will work throughout the full screen width.

When finished with MICROSOFT BASIC remember to restore the FULL-VIEW 80 to normal operation with a POKE 258,0 command.

SYSTEM RESET

When the FULL-VIEW 80 is installed as the system console it will establish the SYSTEM RESET hooks so that a system reset will return to the 80 X 24 display. Many software packages also change the system reset hooks so that a system reset will return to the correct place in the software program. If the software package is loaded after the FULL-VIEW 80 is turned on it may change the hooks so that a system reset will no longer return to the FULL-VIEW 80. If you see the 80 X 24 display but no characters appear when you type on the keyboard then it is likely that a system reset has switched the software back to the 40 X 24 screen but left the video switch in the 80 X 24 position. Power off and then back on or run the DOS "ON" program to recover.

FULL-VIEW 80 HARDWARE

The FULL-VIEW 80 uses the SYNERTEK 6545A-1 CRT controller chip. It is a member of the 6545 CRTC family. If you intend to bypass the FULL-VIEW 80 firmware and directly drive the card you should get a copy of the vender data sheets on both the 6545 and the 6545-1. With the 6545-1 the RAM update address must be stored each time a character is read from or stored in the 2K display refresh memory. The FULL-VIEW 80 works in transparent addressing mode with updates occuring during retrace periods.

The CRT controller is addressed through the base memory location $D580.

```
$D580 --- CRTC REGISTER SELECT ADDRESS.  ALSO CRTC STATUS
          REGISTER ADDRESS
$D581 --- CRTC REGISTER DATA ADDRESS

$D583 --- CRTC "DUMMY" ADDRESS FOR TRANSPARENT READS AND
          WRITES.
```

On power up the card's power on reset circuit resets the BANK SELECT and VIDEO SWITCH flip flops and holds a reset on the CRTC reset line. The power on reset is shut off by a write to address $D508.

Scrolling is accomplished by setting the CRTC memory start address to point to the address that, before the scroll, was the second line from the top of the screen. The refresh memory and CRTC start address must be handled in software such that the entire 1920 character display screen is contained in the first 4K of address space of the CRTC. The display memory will wrap around correctly even though the display start address may at times point to near the top of the 2K memory.

If bit 7 (the MSB) of the display data is a "0" the character is displayed in normal video. If it is a "1" the character is displayed in inverse video.

EROM CHARACTER SETS

The FULL-VIEW 80 uses an EROM character generator. If you would like to change the character set you can do so by programming your own EROM character set. The EROM is the single voltage 450 nsec INTEL type. You will also need an EROM burner.

PROGRAMMING THE EROM

Each character is programmed in an 8 X 16 cell matrix. The character size is actually 8 X 10 with the extra 6 rows unused. Normally it is best to leave space around the character by building it in a 7 X 9 or 5 X 7 sub-cell within the larger 8 X 10 master cell.

ROW ADDRESS	0	1	2	3	4	5	6	7	EROM DATA BIT	EROM ADDRESS
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										
A										
B										
C										
D										
E										
F										

FIGURE 1 8 X 16 MASTER CELL

Using graph paper make a drawing of the master cell and duplicate it for as many characters as you intend to program.

Draw the character in the master cell by putting dots in the boxes where necessary to form the character. For example, the character "R" in figure 2 is formed with dots in a 7 X 9 sub-cell.

ROW ADDRESS	0	1	2	3	4	5	6	7	EROM CODE	EROM ADDRESS
0	●	●	●	●	●	●			$3F	$520
1	●						●		41	521
2	●						●		41	522
3	●						●		41	523
4	●	●	●	●	●	●			3F	524
5	●			●					09	525
6	●				●				11	526
7	●					●			21	527
8	●						●		41	528
9									00	529
A										
B										
C										
D										
E										
F										

FIGURE 2

The characters are addressed in the EROM as follows :

EROM ADDRESS BIT	INTERPRETATION
BIT 10	ASCII CHARACTER CODE BIT 6
BIT 9	ASCII CHARACTER CODE BIT 5
BIT 8	ASCII CHARACTER CODE BIT 4
BIT 7	ASCII CHARACTER CODE BIT 3
BIT 6	ASCII CHARACTER CODE BIT 2
BIT 5	ASCII CHARACTER CODE BIT 1
BIT 4	ASCII CHARACTER CODE BIT 0
BIT 3	ROW ADDRESS BIT 3
BIT 2	ROW ADDRESS BIT 2
BIT 1	ROW ADDRESS BIT 1
BIT 0	ROW ADDRESS BIT 0

(BIT 0 is the least significant bit)

Bits 0 through 3 of the EROM address are the row address. It does not mater what data is programmed into row addresses $A through $F since it is not displayed. The remaining EROM address is the 7 bit ASCII character code.

It is possible to display the full 8 X 16 master cell but a FULL-VIEW 80 firmware change is required to convert the number of character rows from 24 to 15. Fifteen rows containing 80 characters each can be displayed with the 8 X 16 cell size. The firmware chip is available from BIT 3 COMPUTER CORPORATION.

TROUBLE SHOOTING GUIDE

Problem :

The 40 X 24 display doesn't work when the monitor is plugged into the 80 X 24 card.

Probable Cause :

Check the two cables from the 80 X 24 card. Make sure that they are plugged in securely. Make sure that the monitor cable is not loose. A good signal and ground connection is needed all the way to the monitor.

If that doesn't help, unplug and reseat the 80 X 24 card (WITH POWER OFF !!).

Problem :

The 80 X 24 image rolls.

Probable Cause :

Adjust the Vertical Hold and Horizontal Hold controls on your monitor until the rolling stops. You should not have to re-adjust when you switch back and forth between 80 X 24 and 40 X 24 displays.

Problem :

The 80 X 24 image spills off the screen

Probable Cause :

There are monitor adjustments to reduce the size of the display.

The monitor controls needed are Vertical Size, Horizontal Size, and Vertical Linearity. They are normally available on the back of the monitor but on some monitors the back cover will have to be removed. Usually, a small screwdriver will fit through a hole on the back of the monitor and permit adjustment of the vertical and horizontal size controls.

CAUTION * THERE ARE HIGH VOLTAGES INSIDE THE MONITOR. If you have to remove the cover and do not have experience with monitors or TV sets, have your ATARI dealer make the adjustments.

A) If the image is too large in the vertical direction :

Change the Vertical size adjustment. Once all 24 lines are displayed, look closely and compare the height of the top line

with the height of the bottom line. If the characters are not the same size, adjust the Vertical Linearity control.

B) If the image is too large in the horizontal direction :

Change the Horizontal Size adjustment. The Horizontal Hold control can be used to shift the screen a little left or right.

Problem :

The 80 X 24 image is garbled :

Probable Cause :

A) If you made a character generator change, turn off power right away and double check the installation. Don't install the character generator upside down!!

B) Check if your monitor has a 75 OHM switch. Normally the best picture is presented when the switch is in the 75 OHM position.

C) The CONTRAST monitor adjustment may be set too high. Experiment with the CONTRAST and INTENSITY (or BRIGHTNESS) adjustments to get the best picture.

Problem :

The characters are fuzzy :

Probable Cause :

The monitor FOCUS control needs adjustment.

If you decide to return the card for repair call in advance to have a return authorization number assigned. We will promptly repair the card and return it to you. Our phone number is 612-881-6955.

FULL-VIEW 80 EDITOR COMMAND LIST

A=USR(54818)	installs 80 column card as system console
A=USR(54879)	restores 40 column screen as system console
CAPS LOWER	selects lower case
ATARI KEY	selects inverse video
ctrl-DELETE	delete character
ctrl-INSERT	insert character
ctrl-(ARROWS)	move cursor
ctrl-TAB	clear tab
ctrl-A	display ATARI screen
ctrl-B	display BIT 3 screen
crtl-C	toggle cursor type (underline/block)
ctrl-E	clear to end of line
ctrl-S	clear to end of screen
shift-CLEAR	clear screen
shift-INSERT	insert line
shift-DELETE	delete line
shift-TAB	set TAB
TAB	tab
OPTION KEY AND SYSTEM RESET	return to 40 X 24 mode
GR.1 - GR.8	select graphic modes
GR.0	select normal text mode
ESC	display next control code

COMMENTS

Please help us improve this manual. Any errors, suggested additions or deletions, or general comments may be made below. Send to BIT 3 COMPUTER CORPORATION, 8120 Penn Ave. S., Suite 548 , MINNEAPOLIS, MN. 55431 .